kompaflex ag

Tailor-made Bellows and Expansion Joints

for fusion reactors, cryogenics and high vacuum applications

About kompaflex

kompaflex is a world class supplier of tailor-made expansion joints and bellows for high vacuum applications. With over 40 years of experience, kompaflex is a specialist in the advanced design and individual manufacturing of expansion joints for critical applications.

Established in 1981 in Switzerland, kompaflex is a family-owned and run company.

With manufacturing facilities in Switzerland and the Czech Republic, as well as an established specialized representative and sales network, we meet the demand of our clients worldwide.

40 YEARS

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Manufacturing in Switzerland and Czech Republic

kompaflex specializes in tailor-made expansion joints designed to customer needs.

Vacuum-tight welding technology

TIG and plasma welding are the most commonly-used procedures at kompaflex. All of our welders have the required training and experience to weld vacuum-tight.

Strict production processes and modern cleaning procedures guarantee clean surfaces to meet the requirements of the vacuum technology entirely.

Welding seam tightness is especially important in the high and ultra-high vacuum range.

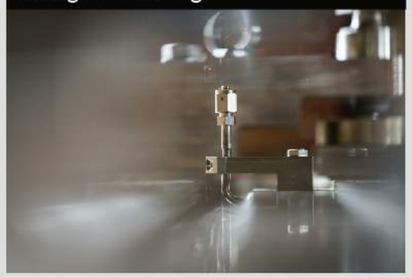
At kompaflex, we achieve helium leak rates of up to $<1*10^{-11}$ Pa*m3/s.

Welding competencies:

- ✓ UHV tight welding seams according to specified leakage rates
- ✓ Certified welders and procedures (EN, ASME, etc.)
- ✓ TIG welding
- ✓ Plasma welding
- ✓ Welding without any gaps
- ✓ Manufacturing in a pressurised clean room

High vacuum technology

VCR connection for permanent bellows leakage monitoring



Bake out test of universal bellows for fusion reactor

kompaflex is highly experienced in the production of expansion joints for ultra-high vacuum systems. Our expansion joints are widely used in renowned research institutes and facilities.

We offer expansion joints for:

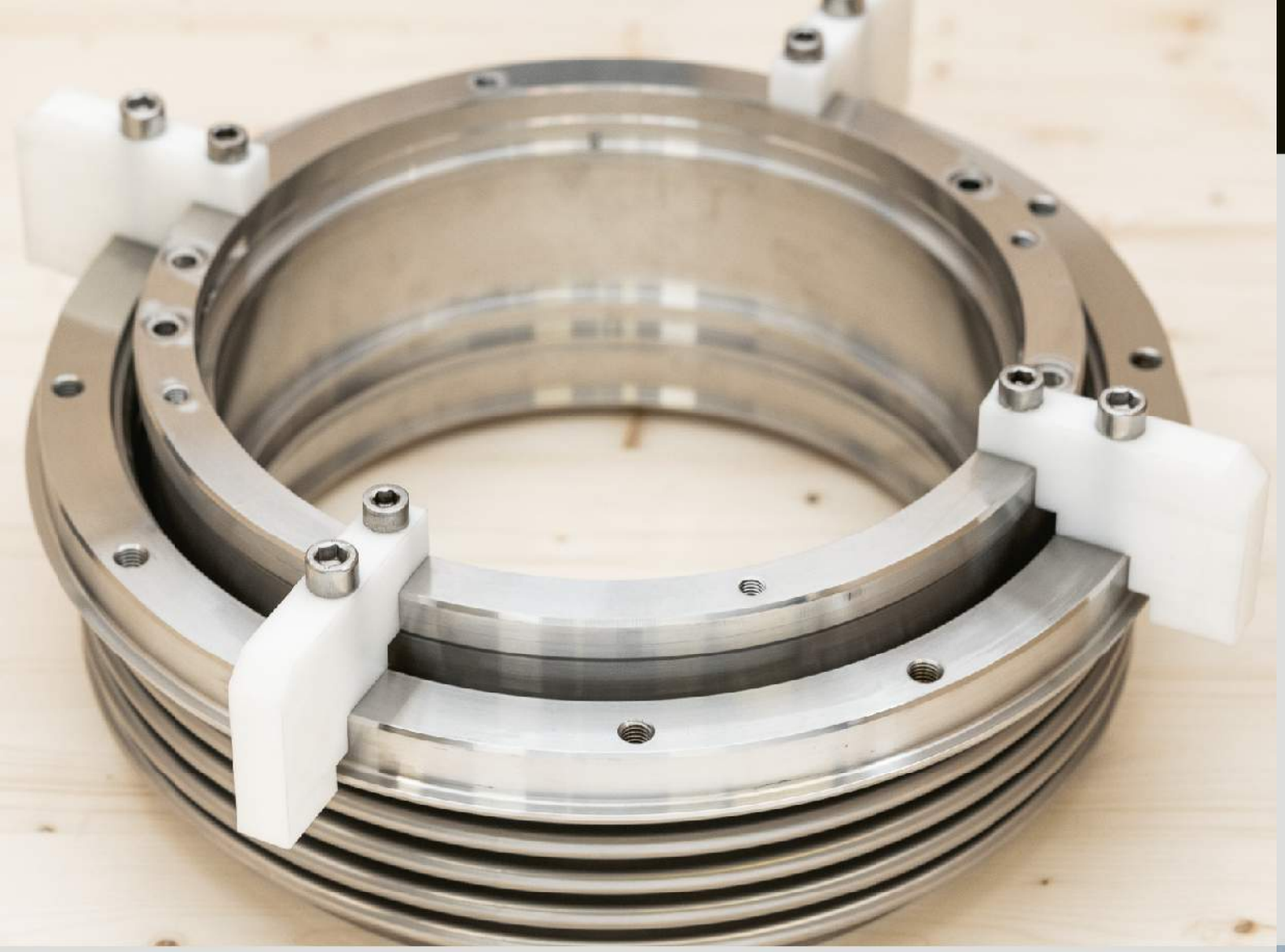
- ✓ Nuclear power plants
- ✓ Particle accelerators
- ✓ Fusion reactors (Tokamaks and Stellerators)
- ✓ Cryogenic facilities and cryostats
- ✓ Vacuum chambers

Our intensive cooperation with world renowned research institutes offers the following advantages to our customers:

- ✓ Continuous growth and development of our specific know-how
- ✓ Modern and proven technology in various applications
- ✓ Highly advanced testing facilities for materials/bellows and leak testing

We are specializied in:

- ✓ High specified leakage rates
- ✓ Leak tightness
- ✓ Cleanliness
- ✓ Movements and very high operational reliability
- ✓ Special shapes like oval, elliptical and rectangular



Clean Room and Packaging

kompaflex own a modular clean room with an area of 800m2 and a 3.2 t crane which allow the handling of also large expansion joints. A constant over pressure, special building material and strict rules always guarantee to meet customers' high demands and quality specifications of cleanliness.

Expansion joints can be individually packed in plastic bags and can be filled with nitrogen to ensure that they leave kompaflex protected and reach the customer in perfect condition.

Quality and Testing

To guarantee flawless quality, we conduct extensive tests and inspections before, during and after the production.

Further is our internal testing personnel in possession of qualifications for most of the common test methods according to ISO and ASME standards. All other tests can be conducted with assistance of competent external partners.

In house test facilities

- ✓ Life cycle testing
- ✓ Pressure tests up to 700 Bar
- ✓ X-ray, ultrasonic tests
- ✓ Vacuum stability test
- ✓ Helium leak detectors (eg. EN1779 methods A2, A3)
- ✓ Vacuum chambers for testing (eg. EN1779 methods A1 / B3 / B5 / B6)
- ✓ Special packaging for UHV bellows

Vacuum and heated chambers for advanced helium leak tests

Cryogenic shock test before leakage test

kompaflex own advanced helium leak test facilities consisting of two chambers:

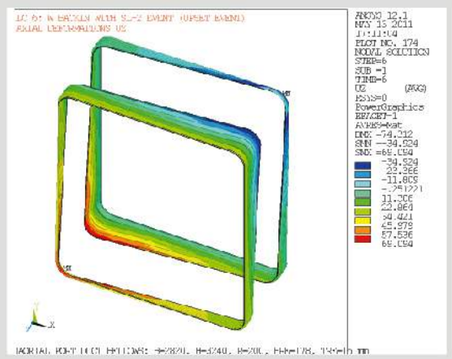
- Large heatable test chamber, inner length 3200 mm, inner diameter 1690 mm
- Large vacuum chamber with various connection possibilities inner length 4100 mm, inner diameter 1690 mm
- PhoeniXL300 from Leybold
- UHV-Pumping bench incl. various pre-pumps
- Electronical recording device Yokogawa

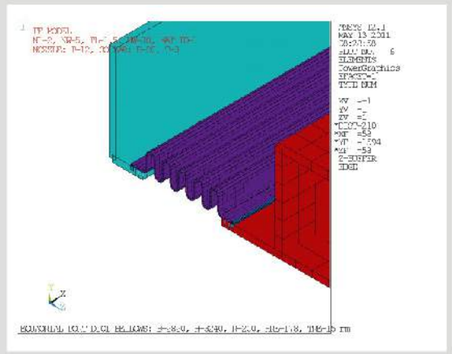
ITER: Contribution to major fusion programs

85 large rectangular multi-ply bellows

ITER : Engineering and prototyping contract

- ✓ Design of bellows
- ✓ Validation by FEM for over 11 load cases
- ✓ Full scale prototype 3.2 x 3.6 m
- ✓ Helium leak test
- ✓ Pressure test
- ✓ Spring rate test
- ✓ Life cycle test





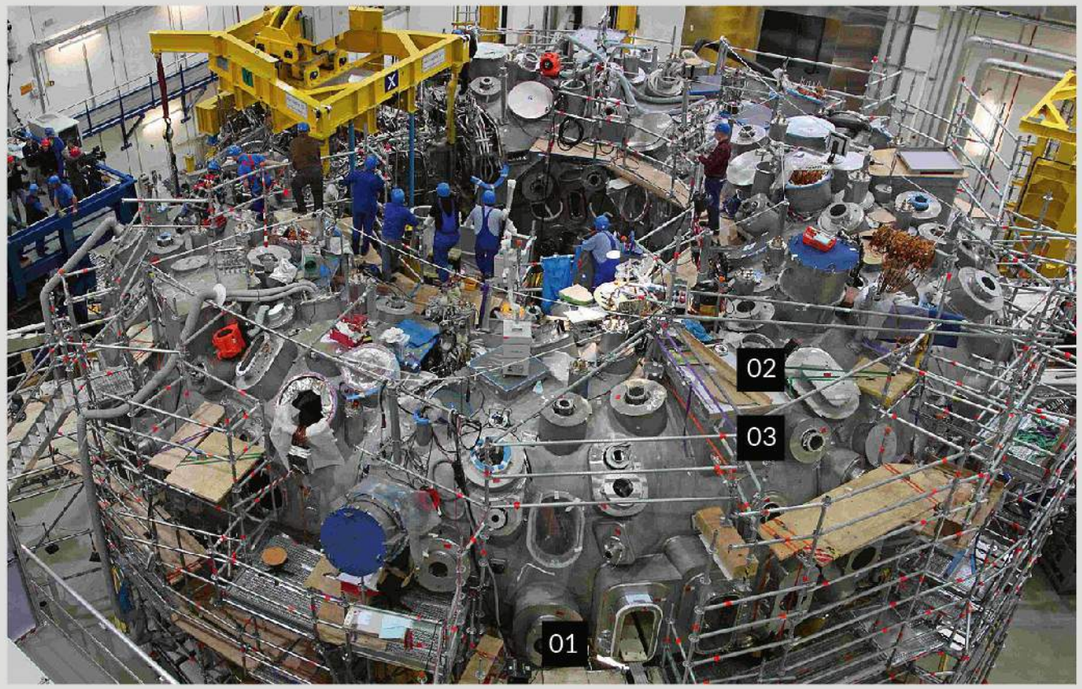
Wendelstein 7-X

254 multi-ply bellows

kompaflex successfully designed and manufactured all 254 multi-ply bellows in circular, oval and rectangular shapes for the Wendelstein 7-X Stellarator, an experimental stellarator in service since 2015.

kompaflex multi-ply bellows in ultra-high vacuum conditions offer:

- ✓ High flexibility, allowing large movements
- ✓ Low spring rates
- ✓ Permanent leakage control
- ✓ Extensive fatigue life



Success stories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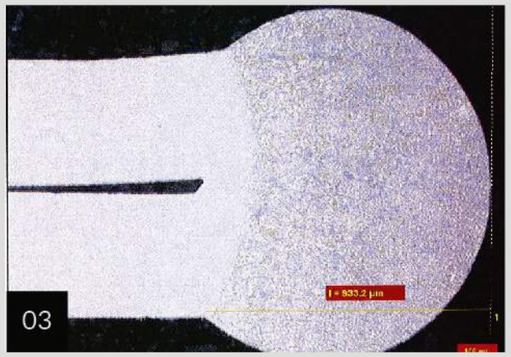
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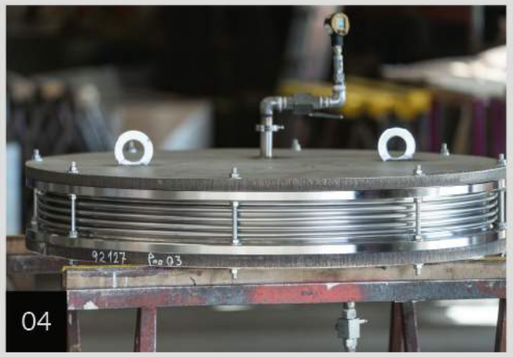
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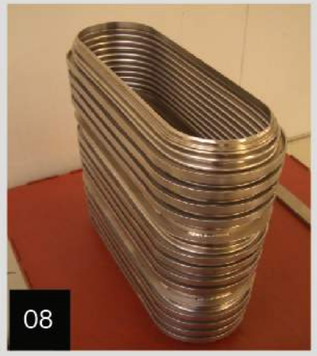
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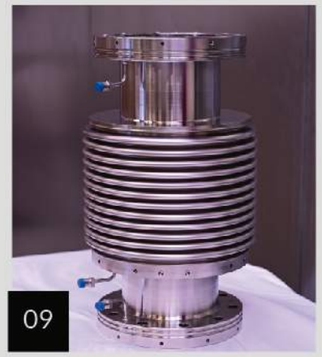
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Nr.	Description
01	Wendelstein 7-X project
02	Single-ply bellows with a special device for adjusting the bellows length in both directions
03	Micrograph of a lip weld under the microscope
04	CERN: Large axial expansion joint during pressure test
05	Oval bellows installed at the beam track LHC Cern
06	ITER IVC Feedthrough bellows: 2-ply bellows; plies are independently welded and redundant with inter-ply tightness
07	GSI, FAIR accelerator, circular expansion joints for dipole and quadrupole magnet
08	Rectangular UHV multi-ply bellows 459/140 with reinforcement rings
09	Double wall cryostat bellows with leakage control & ISF connection
10	High vacuum chamber made in Inconel X750 or 625, UHV tight $1*10^{-9}$mbar*l/s (A1)


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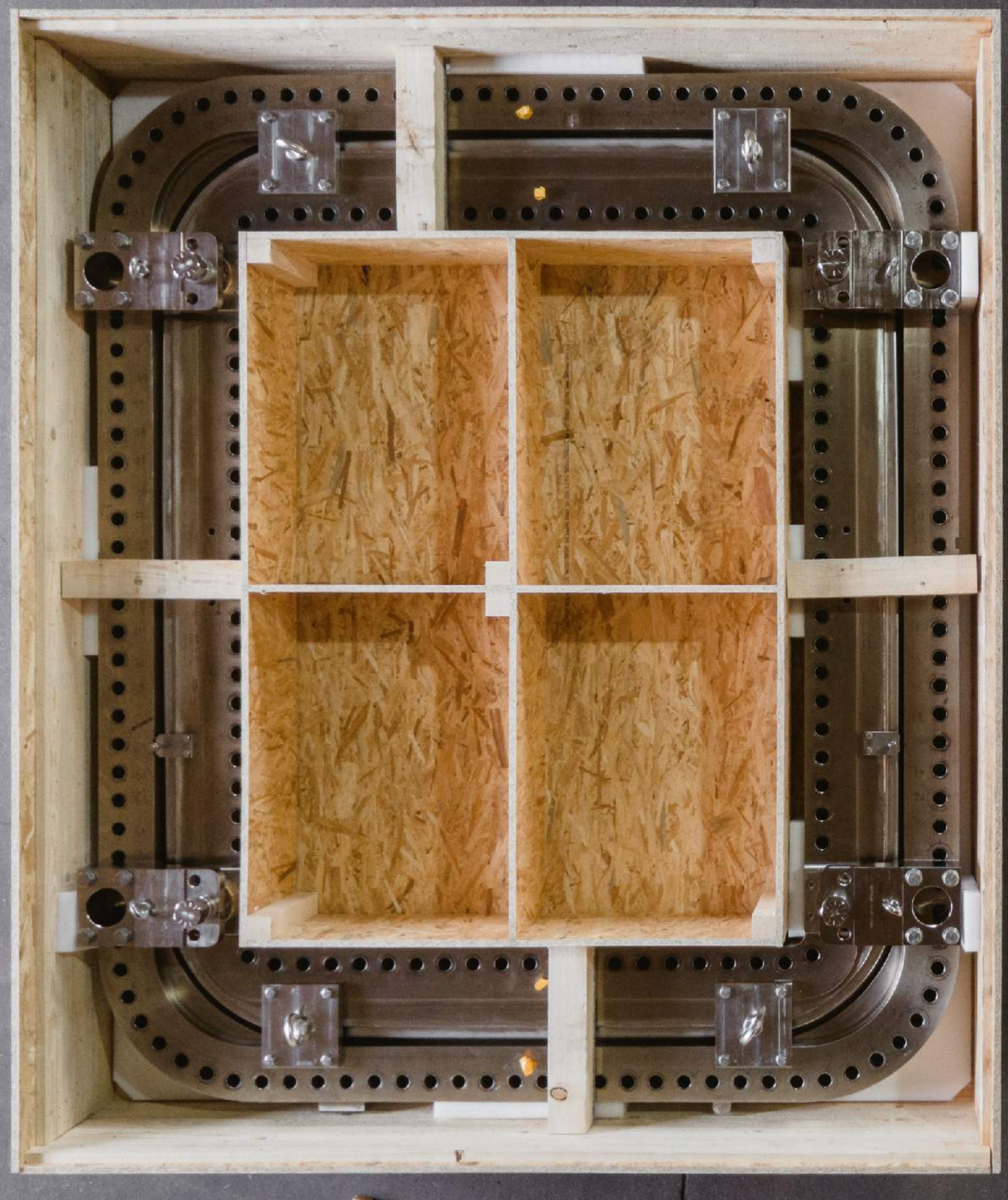
kompaflex is the trusted partner of:

iter · GSI · CERN · MedAustron · VAT · JÜLICH Forschungszentrum · IPP Max-Planck-Institut für Plasmaphysik · research instruments · Kernkraftwerk Leibstadt · Linde · PFEIFFER VACUUM · FORSMARK

Unique multi-ply rectangular bellows for UHV applications



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